IN THE CLAIMS

The following is a complete listing of the claims, and replaces all earlier versions and listings.

1. (Previously Presented) Method of coding information symbols according to a code defined on a Galois field F_q, where q is an integer greater than 2 and equal to a power of a prime number, and of length $n = p(q-1)$, where p is an integer greater than 1, comprising the steps of:

a) choosing a p-tuple of integers $(t_1,...,t_p)$ such that

$q-1 > t_1 > t_2 > ... > tp > 0$,

and a p-tuple of diagonal square matrices $(Y_1,...,Y_p)$ of dimension $(q-1)$ on F_q such that, for any i $(1 \leq i \leq q-1)$, the p elements in position (i,i) of these matrices $Y_1,...,Y_p$ are different in pairs,

b) placing the information symbols successively in p words a_l of length $(q-1- t_l)$ (where $l = 1, ... ,p$),

c) forming words u_l (where $l = 1, ... ,p$) of length $(q-1)$, which constitute the components of the precoded word $u = [u_1\ u_2\ ...\ u_p]$, by supplementing the corresponding word a_l by means of redundant symbols so that u_l is orthogonal to the matrix $H^{(t_l)}$, where the matrices $H^{(t)}$ are defined by

$H^{(t)}_{ij} = \gamma^{i(j-1)}$ $(1 \leq i \leq t, 1 \leq j \leq q-1)$, where γ is a symbol chosen from amongst the primitive elements of Fq, and

d) forming a code word

$$\underline{v} = [\underline{v}_1\ \underline{v}_2 \cdots \underline{v}_p]$$

where each word v_l ($l = 1,...,p$) is of length (q-1), by resolving the system of equations

$$\begin{cases} \underline{v}_l + \underline{v}_2 + \ldots + \underline{v}_p = \underline{u}_l , \\ \underline{v}_1 Y_1 + \underline{v}_2 Y_2 + \ldots + \underline{v}_p Y_p = \underline{u}_2 , \\ \underline{v}_1 Y^2{}_1 + \underline{v}_2 Y^2{}_2 + \ldots + \underline{v}_p Y^2{}_p = \underline{u}_3 , \\ \ldots \\ \underline{v}_1 Y_1^{p-1} + \underline{v}_2 Y_2^{p-1} + \ldots + \underline{v}_p Y_p^{p-1} = \underline{u}_p . \end{cases}$$

2. (Previously Presented) Coding method according to Claim 1, in which an algebraic equation in X and Y is considered such that, for any value γ^{i-1} ($i = 1,...,q$-1) taken by X, the algebraic equation has p distinct solutions denoted y_l (γ^{i-1}) (where l = 1,...,p), and the diagonal element in position (i,i) of each of the matrices Y_l is taken to be equal to $y_l(\gamma^{i-1})$.

3. (Previously Presented) Coding method according to Claim 1 or Claim 2, in which each word a_l (where $l = 1,...,p$) represents a respective approximation of resolution of an image coded at source.

4. (Previously Presented) Method of decoding received data resulting from the transmission of coded symbols according to Claim 1, further comprising the steps of:

e) calculating, from the word received

$$\underline{r} = \left[\underline{r}_1 \, \underline{r}_2 \cdots \underline{r}_p\right],$$

where each word r_1 ($l = 1,...,p$) is of length (q-1), at least one of the components s_l (where $l = 1,...,p$) of length (q-1), of the post-received word $s = [s_1\ s_2\ ...\ s_p\ ]$, according to:

$$\begin{cases} \underline{s}_1 = \underline{r}_1 + \underline{r}_2 + \ldots + \underline{r}_p, \\ \underline{s}_2 = \underline{r}_1 Y_1 + \underline{r}_2 Y_2 + \ldots + \underline{r}_p Y_p, \\ \underline{s}_3 = \underline{r}_1 Y^2{}_1 + \underline{r}_2 Y^2{}_2 + \ldots + \underline{r}_p Y^2{}_p, \\ \qquad \ldots \\ \underline{s}_p = \underline{r}_1 Y_1^{p-1} + \underline{r}_2 Y_2^{p-1} + \ldots + \underline{r}_p Y_p^{p-1}, \end{cases}$$

and

f) calculating at least one of the components $\hat{u}_l$ [(where $l = 1,\ldots,p$) of length (q-1), of the post-associated word $\hat{u} = [\hat{u}_l\ \hat{u}_2 \ldots \hat{u}_p\ ]$, and correcting the word s_l with the same l according to the error syndrome vector $H^{(t_l)} \cdot s_l^T$.

5. (Previously Presented) Method of decoding received data resulting from the transmission of coded symbols according to Claim 2, further comprising the steps of:

e') applying a maximal error correction algorithm to each received word r, so as to obtain an estimation

$$\hat{v} = \left[\hat{\underline{v}}_1\, \hat{\underline{v}}_2 \ldots \hat{\underline{v}}_p\right],$$

where each word $\hat{\underline{v}}_l$ ($l = 1, \ldots, p$) is of length (q-1), of the corresponding transmitted word $\underline{v}$, and

f) calculating at least one of the components $\hat{u}$ (where $l = 1,\ldots,p$), of length (q-1), of the post-associated word $\hat{u} = [\hat{u}_1\ \hat{u}_2 \ldots \hat{u}_p]$, according to:

$$\begin{cases} \underline{\hat{u}}_1 = \underline{\hat{v}}_1 + \underline{\hat{v}}_2 + \ldots + \underline{\hat{v}}_p\,, \\ \underline{\hat{u}}_2 = \underline{\hat{v}}_1 Y_1 + \underline{\hat{v}}_2 Y_2 + \ldots + \underline{\hat{v}}_p Y_p\,, \\ \underline{\hat{u}}_3 = \underline{\hat{v}}_1 Y^2{}_1 + \underline{\hat{v}}_2 Y^2{}_2 + \ldots + \underline{\hat{v}}_2 Y^2{}_p \\ \qquad\qquad \ldots \\ \underline{\hat{u}_p} = \underline{\hat{v}}_1 Y_1^{p-1} + \underline{\hat{v}}_2 Y_2^{p-1} + \ldots + \underline{\hat{v}}_p Y_p^{p-1}\,. \end{cases}$$

6.-10. (Canceled)

11. (Previously Presented) Device for coding information symbols according to a code defined on a Galois field Fq, where q is an integer greater than 2 and equal to a power of a prime number, and of length $n = p(q\text{-}1)$, where p is an integer greater than 1, in which a p-tuple of integers $(t_1,\ldots,t_p)$ such that

$$q\text{-}1 > t_1 > t_2 > \ldots > t_p > 0,$$

and a p-tuple of diagonal square matrices $(Y_1,\ldots,Y_p)$ of dimension $(q\text{-}1)$ on F_q such that, for any i ($1 \leq i$ q-1), the p elements in position (i,i) of these matrices $Y_1,\ldots,Y_p$ are different in pairs, having been chosen, it is able to:

place the information symbols successively in p words a_l of length $(q\text{-}1\text{-}\ t_l)$ (where $l = 1,\ldots,p$),

form words u_l (where $l = 1,\ldots,p$) of length $(q\text{-}1)$, which constitute the components of the precoded word $u = [u_1\ u_2 \ldots u_p]$, supplementing the corresponding word a_l by means of redundant symbols so that u_l is orthogonal to the matrix $H^{(t_l)}$, where the matrices $H^{(t)}$ are defined by

$H^{(t)}_{ij} = \gamma^{i(-1)}$ $(1 \le i \le t, 1 \le j \le q\text{-}1)$, where γ is a symbol chosen from amongst the primitive elements of Fq, and

form a code word

$$\underline{v} = [\underline{v}_1\ \underline{v}_2 \ldots \underline{v}_p],$$

where each word v_l (l = 1, ... ,p) is of length (q-1), by resolving the system of equations

$$\begin{cases} \underline{v}_l & + & \underline{v}_2 & + & \ldots & + & \underline{v}_p & = & \underline{u}_l\,, \\ \underline{v}_1 Y_1 & + & \underline{v}_2 Y_2 & + & \ldots & + & \underline{v}_p Y_p & = & \underline{u}_2\,, \\ \underline{v}_1 Y^2{}_1 & + & \underline{v}_2 Y^2{}_2 & + & \ldots & + & \underline{v}_p Y^2{}_p & = & \underline{u}_3\,, \\ \underline{v}_1 Y_1^{p-1} & + & \underline{v}_2 Y_2^{p-1} & + & \ldots & + & \underline{v}_p Y_p^{p-1} & = & \underline{u}_p\,. \end{cases}$$

12. (Previously Presented) Coding device according to Claim 11, wherein the device is also able to assign the value $y_l\,(\gamma^{i-1})$ to the diagonal element in position (i,i) of each of the matrices Y_l, where, for a predetermined algebraic equation in X and Y, the algebraic equation has p distinct solutions denoted $y_l\,(\gamma^{i-1})$ (where l = 1,..., p) for any value γ^{i-1} (i = 1,..., q-1) taken by X.

13. (Previously Presented) Device for decoding received words r resulting from the transmission of coded words v comprising:

an error correction unit able to apply an error correction algorithm to each word received r, so as to supply at least one component $\hat{u}_l$ (where l = 1,...,p) of a post-associated word $\hat{u}$, and

a redundancy elimination unit able to remove from the component $\hat{u}_l$ the symbols situated at the positions identical to the positions of the component u_l with the

same l of the corresponding precoded word $\underline{u}$, in which redundant symbols were placed at the time of coding.

14. (Canceled)

15. (Previously Presented) Information data transmission apparatus comprising a coding device according to Claim 11 or Claim 12 and a modulator for modulating the data resulting from the coding of the information data.

16. (Previously Presented) Data reception apparatus, comprising a demodulator for demodulating the received data and a decoding device according to Claim 13.

17. (Previously Presented) Information data transmission apparatus, comprising a coding device according to Claim 11 or Claim 12, an interleaver able to permute the symbols of each code word

$v = (v^0, v^1, \ldots, v^{n-1})$ so as to form a word to be transmitted

$$\underline{v}^* = \left(v^0, v^{q-1}, v^{2(q-1)}, \ldots, v^{(p-1)(q-1)}, v^1, v^q, v^{2q-1}, \ldots, v^{(p-1)(q-1)+1}, \ldots, v^{n-1}\right),$$

and a modulator for modulating the symbols of said word to be transmitted v^*.

18. (Previously Presented) Data reception apparatus, comprising a demodulator for demodulating the received data so as to form interleaved received words

$$\underline{r}^* = \left(r^0, r^{q-1}, r^{2(q-1)}, \ldots, r^{(p-1)(q-1)}, r^1, r^q, r^{2q-1}, \ldots, r^{(p-1)(q-1)+1}, \ldots, r^{n-1}\right),$$

where q is an integer greater than 2 and equal to a power of a prime number, p an integer greater than 1, and $n = p(q\text{-}1)$, a deinterleaver for permuting the symbols of each interleaved received word r^* so as to form a received word $r = (r^0, r^1, \ldots, r^{n-1})$, and a decoding device according to Claim 13.

19.-21. (Canceled)

22. (Previously Presented) Method of decoding received symbols, comprising the steps of:

determining a current state of transmission;

selecting one of a plurality of available decoding algorithms in accordance with the current state of the transmission determined in said determining step; and

decoding the received symbols by using the selected decoding algorithm.

23. (Previously Presented) Decoding method according to Claim 22, wherein said determining step includes determining whether or not a mean transmission error rate exceeds a predetermined threshold, and said selecting step includes selecting a first decoding algorithm if the mean transmission error rate is determined to exceed the predetermined threshold and selecting a second decoding algorithm if the mean transmission error rate is determined not to exceed the predetermined threshold.

24. (Original) Decoding method according to Claim 23, wherein the second decoding algorithm is lower in performance but faster in processing than the first decoding algorithm.

25. (Original) Decoding method according to Claim 23, wherein the first decoding algorithm is the Feng-Rao algorithm.

26. (Original) Decoding method according to Claim 23, wherein the second decoding algorithm is an algorithm based on the Reed-Solomon code.

27. (Previously Presented) Device for decoding received symbols, comprising:

determination means for determining a current state of transmission;

selection means for selecting one of a plurality of available decoding algorithms in accordance with the current state of the transmission determined by said determination means; and

decoding means for decoding the received symbols by using the selected decoding algorithm.

28. (Previously Presented) Computer program stored in a computer-readable medium, comprising computer program code instructions for executing the steps of a decoding method according to Claim 22.